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EP 0733518 A1 US 5499840 A US 5251931 A
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(54) Vehicle having two adjacent seats with upper backrest extensions and side airbags

(57) A vehicle has two seats 2, 3 arranged next to one another which have inner 10, 11 and outer 12, 13 side airbags which are accommodated in an associated side element 6, 7, 8, 9 of the upper backrest which extend laterally beyond the lower backrest areas. The side elements reduce the space between seats and allow the airbags to deploy without being impeded by the occupants' bodies. The inflated airbags contact either each other (10, 11 Fig. 2) or the body work (15, 16 Fig. 2) to protect the occupants from striking each other or the body work and to permit transmission of lateral forces.

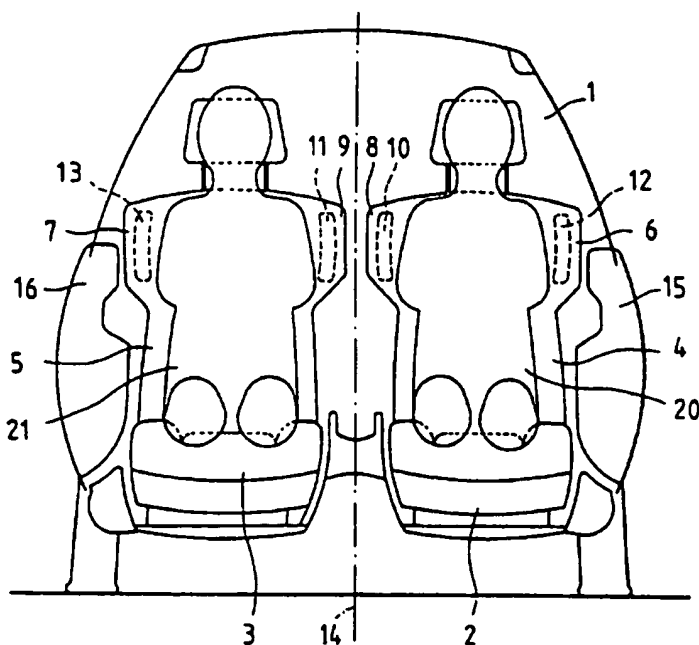


Fig.1

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Fig.2

Vehicle having two adjacent individual seats
and side airbags

The invention relates to a vehicle with two individual seats which are arranged next to one another and have, at least on each of their sides facing away from one another, a side airbag which is accommodated in an associated side element of the upper backrest area.

Patent document DE 37 41 637 C2 describes an individual vehicle seat which has, on both sides in the upper backrest area, side elements which are shaped there so as to project forwards, there being in each side element a side airbag which, in the activated state, forms a support which is arranged laterally next to the head of the user of the seat, and/or a lateral support which extends forwards and/or downwards from the shoulder support. In this way, the intention is to provide increased protection against forces acting in the transverse direction of the vehicle for the user of the seat in the event of a hazard, without the freedom of movement and view of the said user being adversely affected. In the inflated state, the side airbag which is accommodated in the laterally outer side element can be supported on the body of the vehicle, for example on the B pillar.

German Offenlegungsschrift DE 43 34 896 A1 describes a vehicle with two individual seats which are arranged next to one another and which contain a side airbag, accommodated in the lower backrest area, on each of their sides. The side airbags inflate mainly forwards, and slightly outwards from the backrest area when activated, in such a way that two outer side airbags extend as far as the panelling of the vehicle door, and the two inner side airbags come to bear against one another, in which case they may become stuck to one another on the contact surface or can snag in one another, for example as a result of a touch-and-close fastener. The line which extends in the transverse direction of the vehicle and at the level of which the contact surface between the side airbags bearing against one another and the contact surfaces between the outer side airbags and the respective door panelling are located, is located here significantly in front (in the longitudinal direction of the vehicle) of the transverse line produced by the backrest and the headrests.

DE 35 11 216 C1 discloses a seat formation in a motor vehicle in which the space between the backrests of the front seats is filled by a widening of the backrests by means of a stable inlay and upholstery. As a result, a vehicle occupant on the back seat cannot be thrown forwards between the front seats in the event of a crash or full braking.

Furthermore, DE 26 38 204 A1 describes a vehicle seat with lateral extensions which engage over at least one shoulder of a seat occupant and are intended to keep the seat occupant in contact with the seat in the event of a crash.

The present invention seeks to provide a vehicle of the type mentioned at the beginning which provides a high degree of protection, by means of improved support of the sides of the seats, for persons located on the two individual seats, in the event of a hazard, in particular in the event of a side impact.

According to the present invention there is provided a vehicle with two individual seats which are arranged next to one another and include, at least on each of their outer sides, a side airbag which is accommodated in an associated side element of the seat upper backrest area, wherein the upper backrest areas extend, with their side elements essentially laterally beyond the lower backrest areas to near to the adjacent vehicle structure.

In this vehicle, the upper backrest areas are extended to the side on both sides beyond the lower backrest areas, forming side elements, and side airbags are accommodated at least in the side elements facing away from one another. In this context, the side elements protruding to the sides shorten the distance, in this upper backrest area, between the two individual seats themselves, on the one hand, and between the two individual seats and the respective adjacent side structure of the vehicle, on the other, and permit the side airbags accommodated there to inflate unimpeded by the body of the person located on the respective seat. The laterally projecting upper backrest areas, in conjunction with the outer side airbags, provide improved lateral reinforcement and support of the seats on the side structure of the vehicle, in the case of a side impact.

Preferably, the inflated, outer side airbags abut the adjacent side structure of the vehicle in a fashion which is capable of transmitting lateral

forces.

In a development of the invention, side airbags are provided in each side element, on the adjacent sides of the seats. The inflated side airbags, which face one another, protect the users of the seat against hitting one another, and abut one another, in a fashion which is capable of transmitting lateral forces, with a contact surface located essentially in a vertical longitudinal plane of the vehicle. As a result, when the side airbags are inflated, the two individual seats are supported on one another in the upper backrest area, additionally reinforcing the seat group comprising the two individual seats, in the event of an accident, and permitting acting lateral forces to be transmitted via the two backrest areas.

In a development of the invention, in the inflated state, the side airbags, which face one another, abut one another in a fashion which is capable of transmitting lateral forces, even if the backrests of the two individual seats are set at angles of inclination which are somewhat different from one another. In an analogous fashion, the outer side airbags can come to bear against the adjacent side structure of the vehicle, to a large extent independently of the angle of inclination of the backrests, in a fashion which is capable of transmitting lateral forces.

In a development of the invention, the upper backrest areas permit, with the inflated side airbags, the transmission of lateral forces largely along a continuous transverse line thus permitting a high degree of transmission of lateral forces. This is promoted in particular by the fact that the contact surfaces of the side airbags, which bear one against the other, and if appropriate also the surfaces with which the outer side airbags contact the side structure of the vehicle are located on the transverse connection line of the backrests, or at any rate only slightly in front of it.

A preferred embodiment of the invention is illustrated in the drawings and explained below, in which drawing:

- Fig. 1 shows a schematic front view of the front seat group of a passenger vehicle, and
- Fig. 2 shows a schematic view of the front seat group with inflated side airbags, from above.

The passenger vehicle 1 shown schematically in Fig. 1 in the area of its front seat group is, as is customary, equipped with a driver's seat 2 and an adjacent front seat passenger seat 3, arranged next to it and separately from it, as a front seat group. Each of the seats has a backrest 4, 5, the upper backrest area being perceptibly widened on both sides towards the sides over the entire backrest area, forming corresponding side elements 6 to 9. The lateral projection of the side elements 6 to 9 shortens the distances both between the backrests 4, 5 themselves and also between each backrest 4, 5 and an adjacent side structure 15, 16 of the vehicle, for example internal panelling of a door or of a section of the B pillar.

A side airbag 10 to 13 is accommodated in each of the four side elements 6 to 9 in an area which is indicated in Fig. 1 by broken lines and is not covered by the body of vehicle occupants 20, 21 located on the seats 2, 3. In this way, the inflation procedure for these side airbags 10 to 13 is prevented from being impeded by the bodies of the vehicle occupants 20, 21 and a risk of injury for the said vehicle occupants 20, 21 is thus prevented. The side airbags 10 to 13 are arranged and configured in a specific fashion such that when the side airbags are inflated, the situation illustrated in Fig. 2 is brought about. Each side airbag is designed and arranged in such a way that, in the inflated state, it forms, with its outer side facing away from the seat, a relatively large contact area 17, 18, 19, 22 located essentially in a vertical longitudinal plane, i.e. parallel to the vertical longitudinal centre plane 14 of the vehicle. The two outer side airbags 12, 13 come to bear with this contact area 17, 18 in a planar fashion against the respectively opposite side structure 15, 16 of the vehicle. The two inner side airbags 10, 11 which are accommodated in the side elements 8, 9, facing one another, of the two backrests 4, 5 which are located next to one another abut one another with their outer contact areas 19, 22 in a planar fashion along the vertical longitudinal centre plane 14 of the vehicle and thus form a support of the two seats 2, 3, which is capable of transmitting lateral forces, in their upper backrest area.

As is clear in Fig. 2, the side airbags unfold with one component directed forwards and one component directed laterally to the outside. The

forward-directed component of the inflated side airbags 10 to 13 protects the bodies of the vehicle occupants 20, 21 sitting on these seats both against striking one another, which is effected by the two inner side airbags 10, 11. and against injuries from the respective side structure 15, 16 of the vehicle, which is achieved by means of the outer side airbags 12, 13. Viewed in the vertical direction of the vehicle, the lateral unfolding component of the side airbags provides, at the level of the upper backrest areas, continuous reinforcement of the seat structure in the transverse direction in that the driver's seat 2 is supported with its left-hand side airbag 12 on the left-hand side structure 15 of the vehicle and the front seat passenger's seat 3 is supported via its right-hand side airbag 13 on the right-hand side structure 16 of the vehicle, while, at the same time, the two side airbags 10, 11 which face one another abut one another and as a result ensure there is a connection, which is capable of transmitting lateral forces, between the driver's seat 2 and the front seat passenger's seat 3.

This backrest reinforcement, located approximately at the level of the top edge of the door panel, is promoted on the one hand by the side elements 6 to 9, protruding to the sides, of the backrests and, on the other hand, by virtue of the fact that the contact areas 17, 18, 19, 22 of the inflated side airbags 10 to 13 have their maximum lateral extension towards the outside approximately at the transverse line of the backrests 4, 5, or only slightly in front of it, the primary transmission of supporting force taking place there in each case after they come to bear against the side structure 15, 16 of the vehicle and against the side airbag 10 and 11 facing them. As a result, the specific arrangement and configuration of the side airbags provides lateral support, running approximately in a line, of the two seats 2, 3 in the upper backrest area, both against one another and also in the direction of the sides of the vehicle. In this way, when there is the risk of an accident the inflation of the side airbags 10 to 13 gives rise, in interaction with the customary anchoring of the seats 2, 3 with their underside on the vehicle body, to advantageous multi-point seat group reinforcement of the two individual seats 2, 3 with a comparatively large lever arm. If required, the side airbags may be configured as combined head/thorax airbags, in which case they additionally unfold upwards from the upper backrest area.

CLAIMS

1. **A vehicle with two individual seats which are arranged next to one another and include, at least on each of their outer sides, a side airbag which is accommodated in an associated side element of the seat upper backrest area, wherein the upper backrest areas extend, with their side elements essentially laterally beyond the lower backrest areas to near to the adjacent vehicle structure.**
2. **A vehicle according to Claim 1, wherein the laterally outer side airbag of each individual seat is arranged and configured in such a way that, in the inflated state, it abuts, in a fashion which is capable of transmitting lateral force, a vehicle side structure, with a contact area located essentially in a vertical longitudinal plane of the vehicle.**
3. **A vehicle according to Claim 1 or 2, wherein both individual seats are each provided on both sides in their upper backrest areas with side elements which extent essentially laterally beyond the lower backrest areas and in which in each case one side airbag is accommodated, and the side airbags which are accommodated in the side elements which face one another are arranged and configured in such a way that, in the inflated state, they abut one another in a fashion which is capable of transmitting lateral force, with contact areas located essentially in a vertical longitudinal plane of the vehicle.**
4. **A vehicle according to any one of Claims 1 to 3, wherein the side airbags are such that their outer side, which in the inflated state faces away from the seat, forms a large contact area located essentially parallel to a vertical longitudinal plane of the vehicle.**
5. **A vehicle according to any one of Claims 1 to 4, wherein the side airbags are such that, in the inflated state, they extend laterally outwards, with their outer sides which face away from the seat, to the greatest degree in an area which, with respect to the longitudinal direction of the vehicle, is located at most**

slightly in front of the level of the transverse line of the backrests.

6. A vehicle with two individual seats which are arranged next to one another, substantially as described herein with reference to, and as illustrated in, the accompanying drawings.



Application No: GB 9701580.4
Claims searched: 1-6

Examiner: J. C. Barnes-Paddock
Date of search: 2 April 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B7B (BSB) A4L (LAAR LAAT)

Int Cl (Ed.6): B60N 2/00, 42; B60R 21/16, 22

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X P	US 5,499,840 (IKEDA BUSSAN) Figs 2, 5 Two seats with airbags in upper lateral projections between bodywork and passengers.	1-5
X	US 4,946,191 (KEIPER) See Fig. 2 below occupant's arms and col 2, ll.12-22 and 51-65.	1,2,4,5
A	EP 0,733,518 (MORTON) An airbag in an armrest element secured in the middle backrest area.	
A	US 5,251,931 (TRW) Fig. 2. An airbag containing, laterally extending element in the lower backrest area.	

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.